

# Notice of Allowability

Application No.

10/720,327

Examiner

Michael Trinh

Applicant(s)

WANG ET AL.

Art Unit

2822

## -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to application filed 11/24/03 and Interview 12/10/04.
2. ☒ The allowed claim(s) is/are 1-24.
3. ☒ The drawings filed on 24 November 2004 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
  - \* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

### Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_



Michael Trinh  
Primary Examiner

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**DETAILED ACTION**

\*\*\* This office action is in response to filing of the Application on November 24, 2004.  
Claims 1-24 are pending.

**Examiner's Amendment**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.
2. Authorization for this Examiner's Amendment was given in a telephone interview with Mr. Nelson Quintero on December 10, 2004 to amend claims 1 and 13 as detailed below, in which changing "polysilicon" to --conductive-- in claim 13, line 4, provides antecedent basis for "the first conductive layer".

**IN THE CLAIMS:**

- \*\*\* In claim 1, line 4, change "layer and filling" to --layer filling--.
- \*\*\* In claim 1, line 17, change "with a lower surface than the trench" to  
--wherein the upper surface of the second conductive layer is lower  
than the opening of the trench--.
- \*\*\* In claim 13, line 4, change "polysilicon" to --conductive--.
- \*\*\* In claim 13, line 16, change "layer and filling" to --layer filling--.
- \*\*\* In claim 13, line 17, , change "having a lower surface than the trench" to  
--wherein the upper surface of the second conductive layer is lower  
than the opening of the trench--.

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IN THE SPECIFICATION: (For correction of typographical error as “ (from S to S’) “ is shown in FIG. 2f, not FIG. 3. )

\*\*\* Specification Page 4, line 20, change “as in FIG. 3” to --as in FIG. 2f--.

*Allowable Subject Matter*

3. Claims 1-24 are allowed.
4. The following is a statement of reasons for the indication of allowable subject matter:  
The references including Lee (6,083,787), Gruening et al. (6,437,381), Tews et al. (6,426,253), etc., of record, alone or in combination, do not fairly anticipatively disclose each and every aspect of the claimed method, or fairly make a prima facie obvious case of the claimed method, in combination with other processing claimed limitations as recited in base claims, the inclusion of, such as in claim 1, forming a first conductive layer filling a portion of the trench; forming a  $\alpha$ -silicon layer on the sidewall of the trench and the first conductive layer, wherein the  $\alpha$ - silicon is thicker at the top of the trench than elsewhere; oxidizing the  $\alpha$ -silicon layer to form a silicon oxide layer; forming a dielectric layer on the silicon oxide layer, and anisotropically etching the dielectric layer and the silicon oxide layer to form a collar dielectric layer on the sidewalls of the trench; forming a second conductive layer to fill the trench, wherein the upper surface of the second conductive layer is lower than the opening of the trench; and recessing the collar dielectric layer below the second conductive layer such that the substrate surface at the sidewall of the trench is exposed.

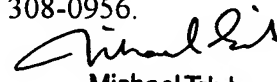
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael M. Trinh whose telephone number is (571) 272-1847. The examiner can normally be reached on M-F: 8:30 Am to 5:00 Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone numbers for the organization where this application proceeding is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Oacs-102

  
Michael Trinh  
Primary Examiner